DARPA-RA-19-01 Young Faculty Award (YFA)
Topic Area (TA)
Frequently Asked Questions (FAQs)
<mark>**as of 11/13/19**</mark>

Topic Area 1:

1Q: Is it necessary to obtain original samples of Roman concrete?
        1A: Obtaining original samples of Roman concrete is not required.

2Q: Is this topic targeted more towards chemistry or mechanics approaches?
        2A: We are interested in both chemical and mechanical approaches.

Topic Area 2:

1Q: The topic description states "Simpler measurements for biomarkers such as pH or oxygenation are not of interest nor are biophysical sensors." In this context, what does "biophysical sensor" mean?
        1A: A biophysical sensor detects physical properties of cells and/or tissues such as mechanical stress (compression, stretch, etc.), stiffness, topography, shear flow, electric field, etc.

2Q: The YFA solicitation description for Topic Area 2, in vivo Biosensors, states that "biophysical sensors" are not of interest. Could you please elaborate on what you consider a biophysical sensor? What is the type of sensors that would be of interest in this topic area?
        2A: A biophysical sensor detects physical properties of cells and/or tissues such as mechanical stress (compression, stretch, etc.), stiffness, topography, shear flow, electric field, etc. We are interested in biochemical sensors to detect the presence and quantity of specific biomolecules in vivo. These biomolecules may include cytokines, chemokines, growth factors, etc.

Topic Area 3:

1Q: Are non-mammalian production hosts within the scope of TA3?
        1A: Non-mammalian production hosts are not within scope of TA3.

Topic Area 5:

1Q: Regarding detection and mitigation of airborne pathogens or chemical contaminants for confined spaces; should the PI be focusing on usual indoor airborne pathogens/contaminants or the DOD's interest is on biological/chemical agents?
        1A: Both "usual" or "agents" are in scope.

2Q: For example, if a proposed system filters out metals and particulate matters using microorganisms, are these of interest for this DOD RFP?

    2A: All airborne pollutants, toxins, and heightened pathogen, chemical, and/or pollutant presence are in scope.

3Q: Should the proposed system be focused on both detection and mitigation? Or either detecting or mitigating suffices?

    3A: Both detection and mitigation.

4Q: Are real-world application-based proposals considered for this RFP?

    4A: Yes.

Topic Area 9:

1Q: Does the scope of the topic area include building devices with sufficient processing power and bandwidth of neural signals to enable new brain computer interactions that would lead to more intelligent forms of AI in the future?

    1A: No.

Topic Area 13:

1Q: Can you clarify what "scientific model" means in the description, and give some examples of what types of scientific software will this effort be looking into?

    1A: Scientific software is software that is designed to help scientists turn scientific models in computational simulation models.

Topic Area 14:

1Q: Can approaches focus on a particular class of computational models (e.g. agent-based models, statistical learning models, etc.) or should they refrain from making assumptions about the underlying modeling approach? (As long as it is computational, of course.)

    1A: Yes.

2Q: Would this TA support the development of *new* models / theories, or should approaches focus on existing models / theories only?

    2A: Yes.

3Q: Would approaches featuring crowd-sourcing and/or participatory modeling be allowed as part of this TA?

    3A: Yes.

Topic Area 16:

1Q: Is TA 16 more focused on theory and modeling versus experiments and devices?

1A: The topic is not written to focus on theory at the expense on experimentation and both can be important tools to explore this problem space within the scope of a YFA.

Topic Area 17:

1Q: Since Si is the typical substrate for MOSFETs, is the development of oxides on a Si substrate of interest to this call? Currently, III-V MOSFET research is still is exploring the use of HEMTs and diodes. Would the development of high-temperature dielectrics for direct coupled FET logic (DCFL) using devices like HEMTs be relevant to this call?

1A: The development of the high temperature dielectric/semiconductor interface is of interest for this topic. Development on Si substrate does not represent a viable path for reaching >500C temperature devices and therefore is not of interest in this topic. Development of SiC CMOS and GaN direct-coupled FET logic (DCFL) are two examples of platforms of interest.

Topic Area 21:

1Q: What is the reactor power range the antinueutrino-detectors should be most relevant to? Some proposed micro-modular reactors can be as small as ~1 MW(th) wheres as the large commercial reactors can be as big as ~5000 MW(th).

1A: Proposals should focus on the detector technology and how it will improve upon the state of the art. The type of reactor that serves as the source of antineutrinos does not matter unless it significantly affects the antineutrino detection probability of the proposed detector technology (e.g., due to the antineutrino energy spectrum). For the purpose of comparing detector technologies, the antineutrino energy spectrum of a typical commercial power reactor can be used.

2Q: What is a practical reactor to detector distance? It is understood that although detector response improves as one gets closer to the reactor, it is not possible to get very near undeclared reactors.

2A: Proposals should focus on how the proposed detector technology will improve upon the state of the art, independent of distance to a reactor. Distance may play a role if, for example, a proposed detector technology is sensitive to all antineutrino flavors, giving such a detector an advantage at certain distances due to neutrino oscillations.

3Q: What is a reasonable measurement time for acquiring reactor data? Longer measurement times can improve confidence in acquired detector data, however, it is understood that operations are generally time-bound.

3A: There is no requirement on measurement time. Proposed detector technologies should be compared against the current state of the art for equal measurement times.

4Q: While it is understood that a smaller detector will be more attractive than a larger one, is there a size above which antineutrino detectors will not be considered practical?

4A: There is no specific size requirement. Size is one of several metrics of interest given in the topic description, and the aim of the topic is to improve upon any one of the stated metrics.

Topic Area 22:

1Q: The TA states "seeking innovative methods for harvesting RF energy with high efficiency in regions with low RF power." Is DARPA looking for solutions for scavenging RF energy already existing in the environment (e.g. existing WiFi signals), transferred from a transmitter designed to be an RF power source for such applications, or both?

    1A: DARPA is looking for RF harvesting from non-cooperative transmitters. The transmission parameters may be known or unknown, but the transmitter may not be redesigned for the purpose of optimizing power harvesting.

Topic Area 24:

1Q: Does topic 24 only consider experimental proposals or are theoretical proposals considered as responsive to this topic?

    1A: DARPA encourages both experimental and theoretical proposals for high entropy alloy studies as they relate to the ability to create materials with unique thermal and electromagnetic properties.

Topic Area 25:

1Q: Object detection of what scale is DARPA interested in? A few meters or a few hundred meters or larger?

    1A: The scale is dependent on the sensing modality. The desire is to mix various sensors.

2Q: Is DARPA interested in the development of new sensors (or techniques of sensing) or in using existing sensors with the focus being on the algorithm behind sensing? Or is DARPA interested in both?

    2A: Traditional sensors and methods are valid. More desired are new techniques that take advantage of distributed sensor nature and large spatial density.

3Q: The RA title for topic 25 refers to "object Identification". Is there a Reynolds number range based on object scale and ocean currents that DARPA is specifically interested in?

    3A: No. DARPA is interested in detecting any/all objects in the ocean environment.

4Q: Tied to question 1, what depth typically are these objects at?

    4A: Objects are expected to be on the surface or in the air.

5Q: Are these "objects" in motion? If so what is the typical time scale that DARPA is interested in?

    5A: Objects might be in motion, anchored, or drifting. DARPA is interested in near real-time reporting of objects, but not to exceed 12 hours of latency.

Topic Area 26:

1Q: Regarding the partially-premixed regime, would single phase (gaseous fuel) or multi-phase (liquid fuel spray) is of interest for this investigation?

    1A: Single phase is primary, but understanding the impact of liquids in the ignition and flame stabilization could also be explored as a secondary objective.

2Q: What is the level of partially-premixed regime? e.g. upstream fuel injection vs. cavity fuel injection?

    2A: A range of degrees of partial-premixing should be explored, this is fundamental research that would guide future decisions on partially-premixed regime in design of these systems.

3Q: Should the investigation have a coupled experimental effort using modern diagnostics and computational modeling? Is there a specific emphasis on experimental vs. modeling?

    3A: Both experimentation and modeling are expected, but the focus is on generating data that others can use eventually in design of these systems.

4Q: Can you please confirm that the outcome of the research is understanding of the scaling parameters and stabilization mechanisms and not the design of engines?

    4A: An understanding of the scaling parameters and stabilization mechanisms is of concern, not design of engines.

5Q: What are the range of conditions (temperatures, pressures) of interest?

    5A: Review literature on Dual Mode Ramjets and Dual Mode Scramjets for guidance.

6Q: What is the desired speed range for the effort? More specifically, what is the desired speed range for fuel and air/oxidizer individually?

    6A: Review literature on Dual Mode Ramjets and Dual Mode Scramjets for guidance.

7Q: Is there a Mach number threshold for which this topic is considering? For example, would ramjet combustors (subsonic combustion) be applicable for the topic?

    7A: A pure ramjet mode with subsonic combustion is not of interest. The offeror's should review the literature for how a Dual Mode Ramjet (DMRJ) operates. Actual Mach numbers will not be available so the literature may be helpful there. In general, the DMRJ has mixed combustion with more subsonic flow in the powerhead/combustor at lower Mach numbers evolving over time to more supersonic flow at higher Mach numbers.

8Q: In the FAQ section (for TA #26), Dual Mode ramjet (DMRJ) and scramjet are repeated a couple of times. Does it mean that the proposed work (both experiment and simulation) should consider a complete DMRJ engine including Nozzel, isolator, combustor, and extender with multiple wall- and core-installed fuel injectors? or a deep fundamental study on the stabilization of a single jet flame (partially-premixed regime) in a supersonic coflow inside a transparent and well-defined combustor for laser optical diagnostics as well as high-fidelity computational study would be sufficient?

8A: It is assumed that the combustor studied will be more fundamental to learn the scaling parameters. If the PI believes, they can learn something of value about the scaling parameters with a DMRJ that includes a multiple fuel injectors and a nozzle, that is acceptable, but not a requirement. Whether or not the combustor studied includes multiple fuel injectors and a nozzle, it is important that the conditions studied be representative of real conditions, as defined through open literature.